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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,952	02/09/2004	Qing Ma	884.804US2	8635
21186	7590	06/13/2005	EXAMINER	
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402-0938			DIAZ, JOSE R	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 06/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/774,952

Applicant(s)

MA ET AL.

Examiner

José R. Díaz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 23-33 is/are pending in the application.
- 4a) Of the above claim(s) 5, 7-10, 13 and 23-33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 11 and 12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/9/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Species I in the reply filed on May 23, 2005 is acknowledged. The traversal is on the ground that there is no serious burden to examine the elected claims 1-13 and 23-33. This is not found persuasive because the claims recite such a multiplicity of species that an unduly extensive and burdensome search is required. As stated in the restriction requirement filed on April 19, 2005, applicant discloses at least three independent inventions consisting of a device comprising a heat spreader having vertical recess sidewalls (figures 1-15), sloped recess sidewalls (figures 16-25), and a planar surface (figure 26). Since the claims are directed to independent inventions, restriction is proper pursuant to 35 USC 121, and it is not necessary to show a separate status in the art or separate classification [MPEP 808.01 (a)]. Thus, the requirement is still deemed proper and is therefore made FINAL.
2. In addition, it is noted that applicant elected claims 5-10, 13 and 23-33 as readable on Species I. However, the examiner disagrees since the elected claims are not readable on Species I but on Species II. For instance, figure 17 of Species II shows a wetting layer (171); figure 19 of Species II shows first and second plurality of solder bumps (172 and 174); and figure 23 of Species II shows a filler material (182). Please note that none of these limitations are shown in figures 1-15 of Species I. Accordingly, claims 5-10, 13 and 23-33 are withdrawn from consideration as being directed to a non-elected invention.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Karnezos (US Pat. No. 5,409,865).

Regarding claim 1, Karnezos teaches a microelectronic package, comprising:

a heat spreader (106) having a first surface, said heat spreader having at least one recess (125) defined therein by at least one sidewall extending from said heat spreader first surface to a recess bottom surface (see fig. 2a);

at least one microelectronic die (101) disposed within said at least one recess, said at least one microelectronic die having an active surface, a back surface, and at least one side (see fig. 2a); and

a thermally conductive material (105) adhering said at least one microelectronic die back surface to said recess bottom surface (see fig. 2a and col. 5, line 1).

Regarding claim 2, Karnezos teaches build-up layers (104 and 203) disposed on said microelectronic die active surface and said heat spreader first surface (see fig. 2a).

Regarding claim 6, Karnezos teaches that said thermally conductive material (105) is epoxy (col. 5, line 1)

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 3-4 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karnezos (US Pat. No. 5,409,865) in view of Shibamoto et al. (US Pat. No. 6,563,212 B2).

Regarding claims 3 and 11, Karnezos teaches that said build-up layers comprise at least one dielectric layer (104) abutting said at least one microelectronic die active surface and said heat spreader first surface (see fig. 2a).

However, Karnezos fails to teach the limitation of at least one conductive trace disposed on said at least one dielectric layer.

Shibamoto et al. teaches a microelectronic die (1) disposed on a heat spreader (4), wherein a plurality of extended wiring traces (10) are provided on a dielectric layer (8) that abuts the active surface (surface having solder balls 16) of the microelectronic die (1) (see fig. 12).

Karnezos and Shibamoto et al. are analogous art because they are from the same field of endeavor as applicant's invention. At the time of the invention it would have been obvious to a person of ordinary skill in the art to include a plurality of extended wiring traces on the dielectric layer that abuts the active surface of the microelectronic die. The motivation for doing so, as is taught by Shibamoto et al., is improving the connection reliability of the package (col. 10, lines 18-19). Therefore, it would have been obvious to combine Shibamoto et al. with Karnezos to obtain the invention of claims 3-4 and 11-12.

Regarding claims 4 and 12, Karnezos further teaches that said at least one dielectric layer (104) is disposed within gaps (125) between said at least one recess sidewall and said at least one microelectronic die side (see figs. 2a and 3b-2).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kovac et al. (US Pat. No. 6,723,584 B2) teaches a chip (530) within an opening of a heat spreader (520) [fig. 8]; Dishongh et al. (US Pat. No. 6,461,891 B1) teaches a chip (40) positioned inside of a heat spreader (10) [fig. 11]; Ma et al. (US Pat. No. 6,794,223 B2) teaches a chip (220) within an opening of a heat

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spreader (210) [fig. 4]; Hoffman (US Pat. No. 5,805,427) also teaches a chip (28) within an opening of a heat spreader (14) [fig. 10]; and finally, Laine et al. (US Pat. No. 5,728,606) teaches a chip (13') within an opening of a heat spreader (11), wherein the opening is filled with first and second dielectric materials (59 and 61) [fig. 2].

Correspondence

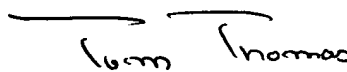
Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R. Díaz whose telephone number is (571) 272-1727. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



José R. Díaz
Examiner
Art Unit 2815



TOM THOMAS
SUPERVISORY PATENT EXAMINER